RAILROAD COMMISSION OF TEXAS
OFFICE OF GENERAL COUNSEL

OIL AND GAS DOCKET NO. 06-0279188

IN THE PANOLA (GOODLAND LIME) FIELD, PANOLA COUNTY, TEXAS

AGREED FINAL ORDER APPROVING THE APPLICATION OF SAMSON LONE STAR, LLC FOR SALTWATER DISPOSAL AUTHORITY IN THE POWELL BOTTOM SWD WELL NO. 1 PANOLA (GOODLAND LIME) FIELD, PANOLA COUNTY, TEXAS

The Commission finds that after statutory notice in the above-numbered docket heard on December 17-18, 2012, the applicant and Railroad Commission staff have prepared this Agreed Order containing findings of fact and conclusions of law; that the proposed application is in compliance with all statutory requirements; and that this proceeding was duly submitted to the Railroad Commission of Texas at conference held in its offices in Austin, Texas.

The Commission, after review and due consideration of the Agreed Order, the findings of fact and conclusions of law contained therein, hereby adopts as its own the findings of fact and conclusions of law contained herein.

FINDINGS OF FACT

1. Notice of this hearing was given to all persons entitled to notice at least ten (10) days prior to the hearing.

2. The Powell Bottom SWD No. 1 has not been drilled. Samson Lone Star, LLC ("Samson") plans to drill the well to a maximum depth of approximately 2,950 feet. The top of the Goodland Lime is expected to occur at approximately 2,532 feet.

3. The maximum requested injection volume is 9,500 barrels of water per day and the maximum requested surface injection pressure is 1,250 psi. The requested disposal interval is the Goodland Lime formation between approximately 2,500 and 2,900 feet.

4. The Powell Bottom SWD No. 1 will be cased and cemented in a manner to protect usable quality water and injection will be confined to the injection interval.

   a. The subject well will have 500 feet of 9 5/8" surface casing cemented to surface.

   b. The subject well will have approximately 2,950 feet of 7" casing, cemented with 350 sacks of cement with a top of cement at the surface.

c. Injection will be through tubing set on a packer no higher than 100 feet above the top of the injection interval.

d. The Railroad Commission Groundwater Advisory Unit recommends that usable- quality water be protected to 450 feet in the area of the proposed well.

5. There are three wellbores within one-half mile of the proposed disposal well.

a. The Lone Star Biggs No. 1 and the O'Benco Biggs No. 1 have been plugged and abandoned.

b. The Chevron Werner Spradley Unit No. 5-C is 2,850 feet from the proposed location.

6. There are more than two dozen wells within two miles of the proposed disposal well and most, if not all, likely have the proposed disposal zone exposed in an uncemented cased-hole annulus.

7. Staff denied the application due to concerns that Samson's proposed disposal operation has the potential to over-pressurize the Goodland Lime, thereby causing wells in the area of influence with uncemented wellbores across the Goodland Lime to become conduits of non-confinement of fluids injected into the proposed disposal zone.

8. There are two disposal wells in the Goodland Lime zone within 4.7 miles of the proposed disposal well.

9. There are three commercial salt water disposal wells, in what may be the Goodland Lime, 6.8 miles, 17 miles and 19 miles from the proposed location.

10. Pursuant to the October 29, 2012 staff letter denying the application, Samson performed a pressure front calculation showing that the nearest well that is not isolated across the Goodland Lime Formation will not act as a conduit for migration of injected fluids.

11. The Samson pressure front calculation showed an increase in formation pressure at the Chevron Werner Spradley Unit Well No. 5-C of 81 psi after one year of injection, an increase of 146 psi after five years, and an increase of 201 psi after twenty years. Samson believes its analysis demonstrates a de minimus increase in pressure. Railroad Commission staff does not agree with the assumptions Samson uses to reach the predicted pressure increases in this finding.

12. If the frac water and salt water to be disposed of in the proposed wells is not disposed in the Powell Bottom SWD well, Samson's plan is to dispose in other disposal wells in the area which Samson believes are at formation pressure greater than that which will be experienced in the Powell Bottom SWD well.

13. Samson predicts that it will drill approximately 16 horizontal drainhole wells in the area that will produce salt water or fracture flowback water to be disposed of in the proposed Powell Bottom SWD well.

14. If the expected disposal rate occurs as indicated by Samson's current drilling plan and is utilized in a pressure front calculation, Samson predicts that at the end of the life of the drilling and production of those wells in 20 years, the formation pressure at the Chevron Werner Spradley Unit Well No. 5-C will only increase by 81 psi. Railroad Commission staff does not agree with Samson's prediction.

15. Samson believes the proposed salt water disposal well will have a much lower pressure than the vast majority of injection wells in the area and Samson will be relieving the stress or any overpressurization on existing wells by transferring the injection fluid into the proposed Powell Bottom SWD well. Staff does not agree.

16. In order to resolve the dispute and resolve the question of whether the Goodland Lime Formation is now or will become over-pressured, Samson proposed a testing procedure to establish pressures in the formation after drilling the proposed well and prior to injection, and at various periods of time after the injection begins.

17. The Samson testing procedure is designed to evaluate the condition of the injection reservoir and how Samson's proposed injection will affect it.

18. The testing procedure is agreed to by the Railroad Commission staff and Samson. The testing procedure provides:

    a. Samson will perform an initial static bottom hole pressure test to quantify reservoir pressure prior to injection into Goodland Lime.

    b. Samson will assure the initial static bottom hole pressure test is witnessed by Commission field personnel and provide raw data from the test to the District Office and the UIC section of the Oil and Gas Division within 48 hours of completing the test.

    c. Measurement for the static bottom hole pressure test will be either via a drill stem test during drilling or a pressure bomb run after completion.

    d. Samson and the Commission agree 0.465 psi/ft is the normal pressure gradient for purposes of evaluating results of the initial static bottom hole pressure test.

    e. The permit will be cancelled if the initial pressure is 250 psi/ft or greater than the normal pressure gradient.

    f. Samson will notify the District Office and the UIC section of the Oil and Gas Division of the date it starts injection.

g. Samson will conduct a pressure fall off test **six months** after injection has commenced. Samson will provide the District Office at least 72 hours notice of the test time and date to allow the Commission to witness the test. The permit will be cancelled if the average reservoir pressure determined by analysis of the fall off test by a registered professional engineer in Texas is 250 psi/ft or greater than normal gradient pressure. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall off test.

h. Samson will conduct a pressure fall off test **twelve months** after injection has commenced and provide the Commission an opportunity to witness the test as stated above. The permit will be cancelled if the average reservoir pressure determined by analysis of the fall off test by a registered professional engineer in Texas is 250 psi/ft or greater than normal gradient pressure. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall off test.

i. Samson will conduct a pressure fall off test **annually** from the twelve month test and provide the Commission an opportunity to witness the test as stated above. The permit will be cancelled if the average reservoir pressure determined by analysis of the fall off test by a registered professional engineer in Texas is 250 psi/ft or greater than normal gradient pressure. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall off test.

CONCLUSIONS OF LAW

1. Proper notice was issued in accordance with the applicable statutory and regulatory requirements.

2. All things have occurred to give the Railroad Commission jurisdiction to consider this matter.

3. The use or installation of the proposed injection well, subject to the agreed testing, is in the public interest.

4. The use or installation of the proposed injection well will not endanger or injure any oil, gas, or other mineral formation.

5. With proper safeguards, as provided by terms and conditions in this final order, which are incorporated into this conclusion of law by reference, both ground and surface fresh water can be adequately protected from pollution.

6. Samson Lone Star, LLC has made a satisfactory showing of financial responsibility to the extent required by Section 27.073 of the Texas Water Code.

7. Samson Lone Star, LLC has met its burden of proof and satisfied the

requirements of Chapter 27 of the Texas Water Code and the Railroad Commission's Statewide Rule 9.

Therefore, it is **ORDERED** by the Railroad Commission of Texas that Samson Lone Star is hereby authorized to conduct non-commercial multi lease salt water disposal operations in the Powell Bottom SWD Well No. 1, Panola (Goodland Lime) Field, Panola County, Texas subject to the following terms and conditions.

SPECIAL CONDITIONS:

1. Fluid shall only be injected into the subsurface depth interval from 2,500 feet to 2,900 feet.

2. The injection volume shall not exceed 9,500 barrels of saltwater per day.

3. The maximum operating surface injection pressure shall not exceed 1,250 psig.

4. Surface casing shall be set at 500 feet, with cement circulated to surface.

5. The well must have approximately 2,950 feet of casing set and cemented with no less than 350 sacks of cement.

6. A cement bond log must be run to determine the actual height of cement with good bonding behind the longstring.

7. The well testing procedure for this well shall be as follows:

    a. Samson will perform an initial static bottom hole pressure test to quantify reservoir pressure prior to injection into Goodland Lime.

    b. Samson will assure the initial static bottom hole pressure test is witnessed by Commission field personnel and provide raw data from the test to the District Office and the UIC section of the Oil and Gas Division within 48 hours of completing the test.

    c. Measurement for the static bottom hole pressure test will be either via a drill stem test during drilling or a pressure bomb run after completion.

    d. Samson and the Commission agree 0.465 psi/ft is the normal pressure gradient for purposes of evaluating results of the initial static bottom hole pressure test.

    e. The permit will be cancelled if the initial pressure is 250 psi/ft or greater than the normal pressure gradient.

    f. Samson will notify the District Office and the UIC section of the Oil and Gas Division of the date it starts injection.

    g. Samson will conduct a pressure fall off test **six months** after injection has

commenced. Samson will provide the District Office at least 72 hours notice of the test time and date to allow the Commission to witness the test. The permit will be cancelled if the average reservoir pressure determined by analysis of the fall off test by a registered professional engineer in Texas is 250 psi/ft or greater than normal gradient pressure. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall off test.

h. Samson will conduct a pressure fall off test **twelve months** after injection has commenced and provide the Commission an opportunity to witness the test as stated above. The permit will be cancelled if the average reservoir pressure determined by analysis of the fall off test by a registered professional engineer in Texas is 250 psi/ft or greater than normal gradient pressure. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall off test.

i. Samson will conduct a pressure fall off test **annually** from the twelve month test and provide the Commission an opportunity to witness the test as stated above. The permit will be cancelled if the average reservoir pressure determined by analysis of the fall off test by a registered professional engineer in Texas is 250 psi/ft or greater than normal gradient pressure. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall off test.

STANDARD CONDITIONS:

1. Injection must be through tubing set on a packer. The packer must be set no higher than 100 feet above the top of the permitted interval.

2. The District Office must be notified 48 hours prior to:

   a. running tubing and setting packer;
   b. beginning any workover or remedial operation;
   c. conducting any required pressure tests or surveys.

3. The wellhead must be equipped with a pressure observation valve on the tubing and for each annulus.

4. Prior to beginning injection and subsequently after any workover, an annulus pressure test must be performed. The test pressure must equal the maximum authorized injection pressure or 500 psig, whichever is less, but must be at least 200 psig. The test must be performed and the results submitted in accordance with the instructions of Form H-5.

5. The injection pressure and injection volume must be monitored at least monthly and reported annually on Form H-10 to the Commission's Austin office.

6. Within 30 days after completion, conversion to disposal, or any workover which results in a change in well completion, a new Form W-2 or G-1 must be filed to show the current completion status of the well. The date of the disposal well permit and the permit number must be included on the new Form W-2 or G-1.

7. Written notice of intent to transfer the permit to another operator by filing Form P-4 must be submitted to the Commission at least 15 days prior to the date of the transfer.

8. Unless otherwise required by conditions of the permit, completion and operation of the well shall be in accordance with the information represented on the application (Form W-14).

9. This permit will expire when the Form W-3, Plugging Record, is filed with the Commission. Furthermore, permits issued for wells to be drilled will expire three (3) years from the date of the permit unless drilling operations have commenced.

10. The operator shall be responsible for complying with the following requirements so as to assure that discharges of oil and gas waste will not occur:

    a. Prior to beginning operation, all collecting pits, skimming pits, or washout pits must be permitted under the requirements of Statewide Rule 8.

    b. Prior to beginning operation, a catch basin constructed of concrete, steel, or fiberglass must be installed to catch oil and gas waste which may spill as a result of connecting and disconnecting hoses or other apparatus while transferring oil and gas waste from tank trucks to the disposal facility.

    c. Prior to beginning operation, all fabricated waste storage and pretreatment facilities (tanks, separators, or flow lines) shall be constructed of steel, concrete, fiberglass, or other materials approved by the Director or Director's delegate and shall be maintained so as to prevent discharges of oil and gas waste.

    d. Prior to beginning operation, dikes shall be placed around all waste storage, pretreatment, or disposal facilities. The containment area shall be dewatered within 24 hours by being disposed of in an authorized disposal facility.

    e. Prior to beginning operation, the facility shall have security to prevent unauthorized access. Access shall be secured by a 24-hour attendant, a fence and locked gate when unattended, or a key-controlled access system. For a facility without a 24-hour attendant, fencing shall be required unless terrain or vegetation prevents truck access except through entrances with lockable gates.

    f. Prior to beginning operation, each storage tank shall be equipped with a device (visual gauge or alarm) to alert drivers when each tank is within 130 barrels from being full.

11. Form P-18, Skim Oil Report, must be filed with the Commission in Austin by the 15th day of the month following the month covered by the report.

The permit number shall be 13983.

Provided further that, should it be determined that such injection fluid is not confined to the approved interval, then the permission given herein is suspended and the fluid injection operation must be stopped until the fluid migration from such interval is eliminated. Failure to comply with all of the conditions of this permit may result in the operator being referred to enforcement to consider assessment of administrative penalties and/or the cancellation of the permit.

All requested findings of fact and conclusions of law which are not expressly adopted herein are denied. All pending motions and requests for relief not previously granted or granted herein are denied.

Pursuant to TEX. ADMIN. CODE § 1.147, this order will be final and effective at the time of the signing of the Commission's order.

Done this 26th day of February, 2013.

RAILROAD COMMISSION OF TEXAS

CHAIRMAN BARRY T. SMITHERMAN

COMMISSIONER DAVID PORTER

COMMISSIONER CHRISTI CRADDICK

ATTEST:

SECRETARY